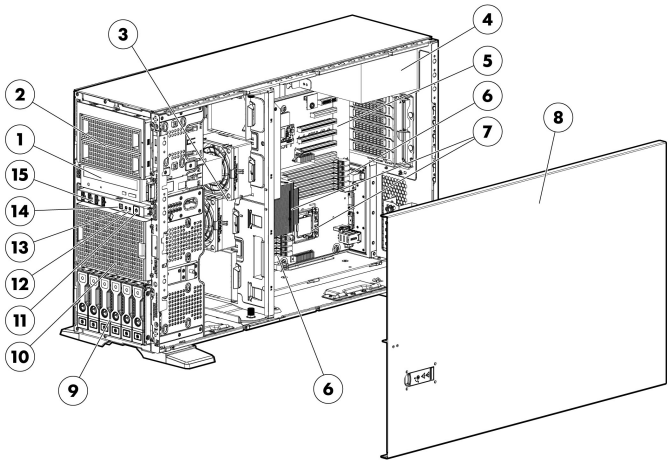
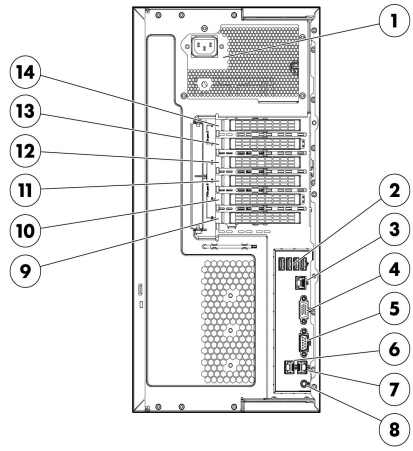
Overview

The HP ProLiant ML350e Gen8 is a dual processor tower platform, which is built on the latest Intel® Xeon® E5-2400 processors to create unique system architecture. This unique architecture as well as flexible deployment options allow the businesses to scale as needed so they can optimize their IT spending dollars. The HP ProLiant ML350e Gen8 delivers the industry's most powerful embedded management technology with HP integrated Lights-Out 4 (iLO4), which allows businesses to manage the servers anytime and from anywhere.





Front View:

1. SATA DVD ROM or DVD RW optical drive
2. Two (2) removable media bays
3. Two (2) standard system fans
4. One (1) standard 460W Non-Hot Plug Power Supply
5. Six (6) PCIe expansion slots (4 PCIe 3.0 and 2 PCIe 2.0)
6. 12 total DIMM slots: DDR3 Registered (RDIMM) or Unbuffered (UDIMM) memory (6 DIMM slots per CPU)
7. Processor and processor heatsink
8. Quick removal access panel
9. Standard drive cage (4LFF or 6LFF or 8SFF)
10. Optional drive cage (6LFF or 8SFF)
11. Power On/Standby button and system power LED button
12. NIC status LED
13. Health LED
14. UID LED button
15. Four (4) USB connectors

Rear View:

1. One (1) standard 460W Non-Hot Plug Power supply
2. Four (4) USB connectors
3. iLO connector
4. Video connector
5. Serial connector
6. NIC connector 2
7. NIC connector 1
8. UID LED button
9. PCIe slot 1 (for processor 1)
10. PCIe slot 2 (for processor 1)
11. PCIe slot 3 (for processor 2)
12. PCIe slot 4 (for processor 2)
13. PCIe slot 5 (for processor 1)
14. PCIe slot 6 (for processor 1)

What's New

- Added HP Hot-Plug 4LFF Shield Metal FIO kit that enables to use 6LFF hot plug chassis as 4LFF hot plug with embedded SATA controller.

Standard Features

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor One of the following depending on Model	**Eight-Core Processors** **NOTE:** All support up to 1600MHz DDR3 memory speeds. Intel® Xeon® E5-2470 (2.3GHz/8-core/95W/20MB) Processor Intel® Xeon® E5-2450 (2.1GHz/8-core/95W/20MB) Processor Intel® Xeon® E5-2450L (1.8GHz/8-core/70W/20MB) Processor **Six-Core Processors** **NOTE:** All support up to 1333MHz DDR3 memory speeds. Intel® Xeon® E5-2440 (2.4GHz/6-core/95W/15MB) Processor Intel® Xeon® E5-2430 (2.2GHz/6-core/95W/15MB) Processor Intel® Xeon® E5-2430L (2.0GHz/6-core/60W/15MB) Processor Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor **Quad-Core Processors** **NOTE:** All support up to 1066MHz DDR3 memory speeds. Intel® Xeon® E5-2407 (2.2GHz/4-core/80W/10MB) Processor Intel® Xeon® E5-2403 (1.8GHz/4-core/80W/10MB) Processor **NOTE:** DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed. **NOTE:** Up to 2 processors supported. Mixing different processor models is not supported. **NOTE:** For the Intel® C600 Chipset E5-2400 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2400x v#, 2 = number of CPUs in a Node, 4 is socket/segment designation, 00 = Processor SKU, x = L for low power SKUs and v# (not yet designated) = version number.
Cache Memory One of the following depending on Model	20MB (1 x 20MB) Level 3 **NOTE:** For Eight-core processors. 15MB (1 x 15MB) Level 3 **NOTE:** For Six-core processors. 10MB (1 x 10MB) Level 3 **NOTE:** For Quad-core processors.
Chipset	Intel® C600 Chipset Intel® E5-2400 Processor Family **NOTE:** For more information regarding Intel® chipsets, please see the following URL: http://www.intel.com/products/server/chipsets/.

Standard Features

Upgradeability	Upgradeable to two processors **NOTE:** Total 8, 12 or 16 cores Up to 12 DIMM slots available for higher memory capacity Up to 24 SFF hard drives or 18 LFF hard drives for expanded storage 4 PCIe 3.0 and 2 PCIe 2.0 I/O slots for additional communications and storage expansion Redundant Power Supplies (92% and 94% efficiency) Tower to rack conversion Optical drive bays (up to 2) Security bezel
On System Management Chipset	HP iLO (Firmware: HP iLO4) **NOTE:** For more information, visit: http://www.hp.com/go/ilo
Memory Protection	Advanced ECC Online Spare Lock-step mode

Memory
One of the following depending on model

Type	HP SmartMemory DDR3 Registered (RDIMM) or Unbuffered (UDIMM)
DIMM Slots Available	12 DIMM slots (6 DIMM slots per CPU)
Standard (Entry Models)	2GB (1 x 2GB) Unbuffered DIMMs PC3L-10600E
Standard (Base Models)	4GB (1 x 4GB) Unbuffered DIMMs PC3L-10600E
Standard (Performance Models)	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
Maximum (RDIMM)	192 GB (12 x 16 GB) RDIMMM
Maximum (UDIMM)	96 GB (12 x 8 GB) UDIMM

NOTE: Redundant Enablement Kit (part # 664046-B21) is required when Registered DIMM is purchased.
NOTE: HP memory from previous generation servers are not fully compatible with the HP ProLiant ML350e Gen8 Server.
NOTE: To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html
NOTE: If one processor is installed, only 6 DIMM slots are available. When populating with two processors 12 DIMM slots are available. For maximum speed, 16 DIMM slots may be populated.
NOTE: Depending on the memory configuration and processor model, the memory speed may run up to 1600MHz or at 1333MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

Network Controller	HP Ethernet 1Gb 2-port 361i Adapter

Standard Features

Expansion Slots

Expansion Slot #	Technology	Bus Width	Connector Width	Bus Number	Form Factor	Notes
6	PCIe 2.0	x1	X4	0	Half Length/Full Height	Activated when installed with Processor 1
5	PCIe 2.0	x4	x8	0	Full-length/Full Height	Activated when installed with Processor 1
4	PCIe 3.0	X8	X16	32	Full Length/Full Height	Activated when installed with Processor 2
3	PCIe 3.0	x16	x16	32	Full Length/Full Height	Activated when installed with Processor 2
2	PCIe 3.0	X16	X16	0	Full Length/Full Height	Activated when installed with Processor 1
1	PCIe 3.0	X4	X8	0	Full Length/Full Height	Activated when installed with Processor 1

NOTE: Bus number - Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number.

HP Server ROM

HP ROM (Read Only Memory) is now digitally signed using HP's Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HP's ProLiant ROM is used to configure the following:

- Processor and chipset status registers

Standard Features

- System memory, memory map, and memory initialization
- System hardware configuration (Integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration (using the HP ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to HP's RBSU (ROM based setup utility) user guide: www.hp.com/support/rbsu.

Storage Controller One of the following depending on model	Entry Models	HP Dynamic Smart Array B120i/Zero Memory SATA Controller (RAID 0,1,10)
	Base Models	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Performance Models	HP Smart Array P420/1GB FBWC Controller (RAID 0/1/1+0/5/5+0)

Internal Storage Devices	Optical Drives	HP Half-Height SATA DVD-ROM Optical Drive
	Hard Drives	None ship standard
	Hard Drive Bays	Up to 24 SFF hard drive bays or 18 LFF hard drive bays **NOTE:** All Pre-configured Models come populated with some hard drive blanks installed. Should the customer need additional hard drive blanks, they can order more using either P/N 666987-B21: HP SFF Gen8 Hard Drive Blank Kit or P/N 666986-B21: HP LFF Gen8 Hard Drive Blank Kit. These part numbers for single HDD blanks below are also provided should the customer require replacement HDD blanks for their server.

Maximum Internal Storage One of the following depending on model	Non-Hot Plug LFF SATA	12TB	4 x 3TB
	LFF SATA/SAS	54TB	18 x 3TB
	SFF SATA/SAS	24TB	24 x 1TB
	LFF SATA SSD	1.8TB	18 x 100GB
	SFF SATA SSD	2.4TB	24 x 100GB

Interfaces	Serial	1
	Video	1 (rear)
	Network RJ-45 (Ethernet)	3 (1 dedicated for HP Integrated Lights-Out)
	HP iLO Remote Management Network Port	1 Gb Dedicated
	SD slot	1 (internal) **NOTE:** The SD slot is not a hot-pluggable device. Customers should not attempt to plug an SD card into the SD slot while the server is powered.
	USB	10 (4 front, 4 rear, 2 internal)

Standard Features

Industry Standard Compliance	ACPI 2.0b Compliant PCIe 3.0 Compliant PXE Support WOL Support Novell Certified IPMI 2.0, SMASH CLP, DCMI 1.0 compliant Microsoft® Logo certifications USB 2.0 Support SMBIOS 2.7.1
Server Power Cords	ProLiant ML servers in a rack-mount configuration no longer ship standard with NEMA power cords that allow connection to 110V US wall outlets in a home or office. These servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant ML rack-mount server using a 110V receptacle (NEMA-15), the NEMA power cord must be ordered separately. The 12' cord (AF556A) or 6' cord (187335-001) can be purchased online at HP.COM. In a tower configuration, the servers ship standard with a 6' NEMA power cord. If customers require a local power cord, they can check the power cord matrix for the appropriate sku. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.
Power Specifications	To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor. **NOTE:** Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html
Common Slot Power Supplies	**NOTE:** Mixing of power supplies in the same server is not supported. All power supplies inside a server must be exactly the same model. Mixing Gold, Platinum, and Platinum Plus certified power supplies is not supported. HP's Common Slot (CS) power supplies allow for commonality of power supplies across a wide range of ProLiant and Integrity servers, as well as HP Storage solutions, and are designed to provide the highest power supply efficiency without degrading system performance. HP CS power supplies are tested by the Electric Power Research Institute (EPRI) and certified through the ECOS 80 Plus power supply program. HP CS power supply options provide efficiency ratings of up to 94% (80 Plus Platinum) and are available in power output options - 460W, 750W , and 1200W - allowing the customer to "right-size" a power supply for their specific server configuration. All HP Common Slot power sources are UL, CE Mark Compliant, hot-plug and support redundant configurations. **NOTE:** Mixing of power supplies in the same server is not supported. All power supplies must be of the same output and efficiency rating. If non-matched power supplies are inserted you will get errors and operation will fail. HP CS Platinum power supplies are required when enabling HP's Intelligent Power Discovery (IPD) solution. IPD is the first technology to create an automated, energy-aware network between IT systems and facilities. This allows your company to reclaim millions of dollars in wasted power capacity and downtime costs across data centers. For more information on HP's IPD solution, go to www.hp.com/go/ipd.

Standard Features

	It is highly recommended that you use the HP Power Advisor in defining the "Right-Size" power supply for your needs. HP Power Advisor can be accessed at: www.hp.com/go/hppoweradvisor. **NOTE:** The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 Plus independently tests power supply efficiency and publicly posts the results on 80Plus.org. Redundant Power: Optional (1 + 1 redundant) power supplies can be purchased through power supply option kits (see Power Supplies for part numbers). **NOTE:** Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html
System Fans	Two (2) Non-hot plug, non-redundant fans ship standard (support up to 4 fans). **NOTE:** Redundant Enablement Kit (part # 664046-B21) is required when redundant fans are needed.
Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows Server Red Hat Enterprise Linux (RHEL) SUSE Linux Enterprise Server (SLES) VMware **NOTE:** For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: http://www.hp.com/go/ossupport and our driver download page http://www.hp.com/support/ML350eGen8
Graphics	Integrated Matrox G200 video standard • 1280 x 1024 (32 bpp) • 1920 x 1200 (16 bpp)
Form Factor	Tower 5U Rackable with the purchase of tower to rack tray kit

On System Management	HP iLO Management Engine	HP iLO Management Engine (iLO ME) is a complete set of embedded management features supporting the complete lifecycle of the server, from initial deployment, through ongoing management, to service alerting and remote support. HP iLO Management Engine comes standard on all HP ProLiant Gen8 Servers. HP iLO Management Engine portfolio includes: • **HP Agentless Management**: With HP iLO Management Engine in every HP ProLiant Gen8 server, the base hardware monitoring and alerting capability is built into the system (running on the HP iLO chipset) and starts working the moment that a power cord and an Ethernet cable is connected to the server. • **HP Active Health System**: HP Active Health System is an essential

component of the HP iLO Management Engine. It provides customers with: Diagnostics tools/scanners wrapped into one; Always on, continuous monitoring for increased stability and shorter downtimes; Rich configuration history; Health and service alerts; Easy export and upload to Service and Support.

- **HP Remote Support**: Embedded Remote Support functions builds on the already established HP Insight Remote Support application that can run either on a stand-alone central system, or as a plug-in to HP Systems Insight Manager. Key parts of that technology now are part of the HP iLO Management Engine and are ready to start working for you, after a few keystrokes on a single activation screen.
- **HP Intelligent Provisioning (previously known as SmartStart)**: HP Intelligent Provisioning offers the ability for out-of-the box single-server deployment and configuration without the need for media. The new HP Intelligent Provisioning takes strengths from products like the former SmartStart, ProLiant Support Packs, and Firmware DVD, then enhances them with Smart Update Manager and driver and firmware updates via the Service Pack for ProLiant (SPP). Intelligent Provisioning provides:
  - The latest ease of use features and places them where you can use them instantly: on the system board, thereby replacing the 2 SmartStart CDs and the Firmware DVD with embedded deployment capability for Gen8 servers. This integrated administrator has everything you need for painless single server system setup and deployment. Best of all, this capability is completely Agentless for improved performance.
    - Deployment Settings allows editing a collection of configuration and deployment settings, saving them in a portable package. and deploying them to the server or multiple servers remotely via iLO. In summary, this feature provides the ability to automatically configure and install remote ProLiant systems using the resulting deployment settings.
- **HP iLO Advanced** - For customers wanting advanced functionality, such as graphical remote console, multi-user collaboration, and video record/playback can be activated with the optional HP iLO Advanced or HP iLO Advanced for BladeSystem licenses. The Advanced licensed features offer sophisticated remote administration of servers in dynamic data center and remote locations and can help significantly reduce cost associated with IT-related travel and unplanned downtime. Also with the new HP iLO is the ability to access, deploy, and manage your server anytime from anywhere with your Smartphone device.

NOTE: For more information, visit:
http://www.hp.com/go/ilomanagementengine

Standard Features

HP Insight Management	HP Service Pack for ProLiant (SPP)	HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) version 5 provide a new, comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling all firmware to be updated online and integrating firmware and system software updates in one operation HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support on each Service Pack for ProLiant. The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM version 5 and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application has been re-written to provide a more straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP will recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline. The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdepencies, when determining the correct updates and order of update deployment. **NOTE:** The Service Pack for ProLiant (which includes HP SUM 5) can be downloaded from www.hp.com/go/spp/download. More information can be found: www.hp.com/go/spp and http://www.hp.com/go/hpsum
Security	Power-on password Setup password Serial interface control Power switch security Administrator's password	

Standard Features

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at:
http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Optional Features

HP Insight Management	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management server: HP Insight Control for Linux, and HP Insight Control. See www.hp.com/go/insightcontrol HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: http://www.hp.com/services/insight.
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). **NOTE:** For more information, visit: http://www.hp.com/go/matrixoe
	HP iLO Advanced License for ProLiant Servers	HP iLO management processors for HP ProLiant Gen8 servers virtualizes system controls to help simplify server setup, engage health monitoring and power and thermal control, and promote remote administration. HP iLO functions out-of-the-box without additional software installation and functions regardless of the servers' state of operation. Basic system board management functions, diagnostics, and essential Lights-Out functionality ships standard across all HP ProLiant Gen8 rack, tower and blade servers. The HP iLO can be accessed from any location via a web browser and works hand-in-hand with HP Systems Insight Manager, Insight Control, and Insight Dynamics, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service to the business. Advanced functionality, such as graphical remote console, multi-user collaboration, and video record/playback can be activated with the optional HP iLO Advanced or HP iLO Advanced for BladeSystem licenses. The Advanced licensed features offer sophisticated remote administration of servers in dynamic data center and remote locations and can help significantly reduce cost associated with IT-related travel and unplanned downtime. **NOTE:** For more information, visit: http://www.hp.com/go/ilo

Optional Features

High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters.
	HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu
	HP HPC Linux Value Pack	HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported option to HP Insight CMU, for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler and Platform Application Center, as well as the HP-MPI parallelization library. HP HPC Linux Value Pack

HP Insight Online	HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime. www.hp.com/go/insightonline

Factory Express Portfolio for Servers and Storage	HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed. Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches. For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express

Optional Features

HP Simple Configurator

SCE is a guided self service tool to help sales and non technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem
Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

What HP ProLiant and BladeSystem Services can do for you
HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. Foundation Care services deliver scalable support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for their business needs. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care or Critical Advantage. These services help deliver high levels of application availability through proactive service management and advanced technical response

You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.

HP Technology Services meets business challenges with services offered in three support recommendations - **Optimized Care, Standard Care, and Basic Care** - available for each product group. Such support solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support recommendations for servers, storage, networking and software designed to meet your specific needs.

All three service recommendations include support services from the broader portfolio of Foundation Care and Proactive Care services.

Optimized Care

Optimized Care: Supports maintaining servers at optimum performance availability

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

HP Installation and Startup for Insight Control Software / HP SIM
Provides for the deployment and basic configuration of HP Insight Control or HP SIM (Systems Insight Manager) on HP ProLiant ML and DL series servers or HP BladeSystem servers
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf

3-Year HP 24x7 4 hour Response, Proactive Care
Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your call and end to end until resolved, delivering a single point of contact for you. Helping you to resolve your hardware and software issues and minimizing downtime in your business critical environment.

Additional Services: Factory Express, Education Services, Proactive Select - 30 Credit Package

Standard Care

Standard Care: Service recommendation that maintains high level of server availability

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner

Service and Support

	http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf **HP Installation and Startup for Insight Control Software / HP SIM** Provides for the deployment and basic configuration of HP Insight Control or HP SIM (Systems Insight Manager) on HP ProLiant ML and DL series servers or HP BladeSystem servers http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf **3-Year HP 24x7 4 hour Response, Collaborative Support** Provides problem resolution support across the stack of HW, firmware, and HP and 3rd party SW. In case the issue is with 3rd party SW, HP does known issue resolution. If HP cannot solve the issue, it will contact the third-party vendor and create a problem incident on your behalf. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-8232ENW.pdf **Additional Services:** Software support service with 24X7 availability with a 2 hour response, Training courses on Microsoft, Linux (Red Hat and SUSE), VMware, and HP Insight Software, 10 Proactive Select Credit package, Factory Express http://www8.hp.com/us/en/business-services/it-services.html?compURI=1078865
Basic Care	**Basic Care: delivers minimum recommended support service level** **HP ProLiant Server Hardware Installation** Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf **3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service** Provides you with rapid remote support and if required an HP authorized technical engineer will be on site 24X7 begin hardware maintenance service within 4 hours of the service request being logged http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf **3-Year , HP 24x7 Software Support for Insight Control** Provides remote 3-year software support service that delivers comprehensive software services, including access to HP technical resources and software updates http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf **Additional Services:** Factory Express, Education Services, Proactive Select - 10 Credits
Insight Remote Support	Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. *HP Support Center Mobile App is subject to local availability
Warranty / Service Coverage	For ProLiant servers and storage systems, the services cover HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external

Service and Support

monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.

For more information

To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant

Pre-configured Models

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.
NOTE: Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.
NOTE: HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.
NOTE: If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.
NOTE: All Pre-configured Models come populated with some hard drive blanks installed. Should the customer need additional hard drive blanks, they can order more using either P/N 666987-B21: HP SFF Gen8 Hard Drive Blank Kit or P/N 666986-B21: HP LFF Gen8 Hard Drive Blank Kit.

Entry Models

HP ProLiant ML350e Gen8 E5-2403 1P 2GB-U Non-hot Plug SATA LFF 460W PS Entry Svr
648375-001

Processor	(1) Intel® Xeon® E5-2403 (1.8GHz/4-core/80W/10MB) Processor
Cache Memory	10MB (1 x 10MB) Level 3
Memory	2GB (1 x 2GB) Unbuffered DIMMs PC3L-10600E
Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
Storage Controller	HP Dynamic Smart Array B120i/Zero Memory SATA Controller (RAID 0,1,10)
Hard Drive	(1) 500GB 6G SATA 7.2K NHP 3.5" N MDL HDD; includes 3 hard drive blanks
Internal Storage	4 LFF Non Hot Plug SATA HDD Bays only
Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
Fans	2 Non-Hot Plug, Non Redundant Fans
Accessories	USB Keyboard and Mouse ship standard
Management	HP iLO Management Engine (standard) Optional: HP Insight Control
Form Factor	Tower (5U)
Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Pre-configured Models

Base Models

HP ProLiant ML350e Gen8 E5-2407 1P 4GB-U Hot Plug SATA 4LFF 460W PS Base Svr 648376-001	**Processor**	(1) Intel® Xeon® E5-2407 (2.2GHz/4-core/80W/10MB) Processor
	Cache Memory	10MB (1 x 10MB) Level 3
	Memory	4GB (1 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Hard Drive	None ships standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug SATA HDD Bays only
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard) Optional: HP Insight Control
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Performance Models

HP ProLiant ML350e Gen8 E5-2420 1P 8GB-U P420 Hot Plug 6 LFF 460W PS Perf Server 648377-001	**Processor**	(1) Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Smart Array P420/1GB FBWC Controller (RAID 0/1/1+0/5/5+0)
	Hard Drive	None ships standard; includes 5 LFF hard drive blanks
	Internal Storage	6 LFF Hot Plug SATA HDD Bays; upgradeable to 12
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard) Optional: HP Insight Control
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Smart Buys

HP ProLiant ML350e Gen8 E5-2403 1P 8GB-U Hot Plug 4LFF 460W PS Svr/S-Buy 686770-S01	**Processor**	(1) Intel® Xeon® E5-2403 (1.8GHz/4-core/80W/10MB) Processor
	Cache Memory	10MB (1 x 10MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/Zero Memory SATA Controller (RAID 0,1,10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

HP ProLiant ML350e Gen8 E5-2420 1P 8GB-U Hot Plug 4LFF 460W PS Svr/S-Buy 686771-S01	**Processor**	(1) Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Smart Buys

HP ProLiant ML350e Gen8 E5-2420 1P 8GB-U Hot Plug 4LFF 460W PS SBS Svr/S-Buy 686772-S01	**Processor**	(1) Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Operating System	MS W2011 SBS Standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

HP ProLiant ML350e Gen8 E5-2440 2P 16GB-R Hot Plug 8SFF 750W PS Svr/S-Buy 686773-S01	**Processor**	(2) Intel® Xeon® E5-2440 (2.4GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	16GB (2 x 8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Smart Array P420/1GB FBWC Controller (RAID 0/1/1+0/5/5+0)
	Hard Drive	None ship standard; includes 7 SFF hard drive blanks
	Internal Storage	8SFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	HP 750W Common Slot Gold Hot Plug Power Supply Kit
	Fans	4 Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.
NOTE: Factory Integrated Models must start with a CTO Server.
NOTE: FIO indicates that this option is only available as a factory installable option.
NOTE: All Factory Integrated Models will be populated with sufficient hard drive blanks based on the number of initial hard drives ordered with the server.

Step 1: Base Configuration (choose one of the following configurable models)

HP Models

ML350e Gen8 Tower Models

HP ProLiant ML350e Gen8 Non-hot Plug 4 LFF Configure-to-order Server 664043-B21

Includes:

HP Ethernet 1Gb 2--port 361i Adapter
HP Dynamic Smart Array B120i SATA Controller (RAID 0/1/10)
Four (4) Non-Hot-Plug (LFF) SATA Drive Bays
Ten (10) USB ports
Six (6) PCIe slots
Two (2) Non-hot plug, non-redundant fans
HP iLO Management Engine (standard)
Tower (5U) form factor

HP ProLiant ML350e Gen8 Hot Plug 6 LFF Configure-to-order Server 664044-B21

Includes:

HP Ethernet 1Gb 2--port 361i Adapter
HP Dynamic Smart Array B120i SATA Controller (RAID 0/1/10)
Six (6) Hot-Plug (LFF) SATA Drive Bays
NOTE: A SAS controller is required to support 6 LFF drives. Otherwise, only 4 SATA drives are supported with the embedded controller. HP Hot-Plug 4LFF Shield Metal FIO Kit (704853-B21) must be selected to use 4 SATA drives with embedded controller.
Ten (10) USB ports
Six (6) PCIe slots
Two (2) Non-hot plug, non-redundant fans
HP iLO Management Engine (standard)
Tower (5U) form factor

HP ProLiant ML350e Gen8 Hot Plug 8 SFF Configure-to-order Server 664045-B21

Includes:

HP Ethernet 1Gb 2--port 361i Adapter
HP Dynamic Smart Array B120i SATA Controller (RAID 0/1/10)
Eight (8) Hot-Plug (SFF) SATA Drive Bays
NOTE: A SAS controller is required to support 8 SFF drives.
Ten (10) USB ports
Six (6) PCIe slots
Two (2) Non-hot plug, non-redundant fans
HP iLO Management Engine (standard)
Tower (5U) form factor

Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

HP Processors	**Eight-Core Processors**	
	NOTE: All support up to 1600MHz memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2470 (2.3GHz/8-core/20MB/95W) FIO Processor Kit	678905-L21
	HP ML350e Gen8 Intel® Xeon® E5-2450 (2.1GHz/8-core/20MB/95W) FIO Processor Kit	678903-L21
	HP ML350e Gen8 Intel® Xeon® E5-2450L (1.8GHz/8-core/20MB/70W) FIO Processor Kit	678901-L21
	Six-Core Processors	
	NOTE: All support up to1333MHz DDR3 memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2440 (2.4GHz/6-core/15MB/95W) FIO Processor Kit	665879-L21
	HP ML350e Gen8 Intel® Xeon® E5-2430 (2.2GHz/6-core/15MB/95W) FIO Processor Kit	665870-L21
	HP ML350e Gen8 Intel® Xeon® E5-2430L (2.0GHz/6-core/15MB/60W) FIO Processor Kit	665862-L21
	HP ML350e Gen8 Intel® Xeon® E5-2420 (1.9GHz/6-core/15MB/95W) FIO Processor Kit	665868-L21
	Quad-Core Processors	
	NOTE: All support up to 1066MHz DDR3 memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2407 (2.2GHz/4-core/10MB/80W) FIO Processor Kit	665866-L21
	HP ML350e Gen8 Intel® Xeon® E5-2403 (1.8GHz/4-core/10MB/80W) FIO Processor Kit	665864-L21
HP Memory	**NOTE:** To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html	
	Registered DIMMs (RDIMMs)	
	NOTE: Redundant Enablement Kit (part # 664046-B21) is required whenever Registered DIMM is purchased.	
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
	HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	690802-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672631-B21
	Unbuffered with ECC DIMMs (UDIMMs)	
	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21

Configuration Information - Factory Integrated Models

	HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669322-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669324-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21
	NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator. **NOTE:** Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: http://h18004.www1.hp.com/products/servers/platforms/energyefficient/	
HP Power Supplies	**NOTE:** Mixing of power supplies in the same server is not supported. All power supplies inside a server must be exactly the same model. Mixing Gold, Platinum, and Platinum Plus certified power supplies is not supported. **NOTE:** Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor.	
	Primary Power Supplies	
	HP 460W Factory Integrated Power Supply Kit **NOTE:** This power supply is non-redundant and is factory integrated only.	667559-B21
	HP Common Slot Platinum Plus Power Supply Kits **NOTE:** The following Power Supplies offer 94% Efficiency with support for Intelligent Power Discovery.	
	HP 460W Common Slot Platinum Plus Hot Plug Power Supply Kit	656362-B21
	HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit	656363-B21
	HP Common Slot Gold Power Supplies **NOTE:** The following Power Supplies offer up to 92% efficiency.	
	HP 460W Common Slot Gold Hot Plug Power Supply Kit	503296-B21
	HP 750W Common Slot Gold Hot Plug Power Supply Kit	512327-B21
	Enablement Kit	
	HP Redundant Enablement Kit	664046-B21
	NOTE: Redundant Enablement Kit (part # 664046-B21) is required for any common slot power supply. **NOTE:** Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html	
HP Security	HP Hot-Plug 4LFF Shield Metal FIO Kit **NOTE:** This FIO kit enables to use 6LFF hot plug chassis as 4LFF hot plug with embedded SATA controller. Shield metal kit must be selected if SAS controller is not required in case of 6LFF hot-plug chassis.	704853-B21

Configuration Information - Factory Integrated Models

Step 3: Choose Additional Factory Integratable Options

HP Security Hardware	HP Hot-Plug 4LFF Shield Metal FIO Kit **NOTE:** For Hot Plug 6LFF CTO Server Only (P/N 664044-B21) . **NOTE:** HP Hot-Plug 4LFF Shield Metal FIO Kit must be selected if a SAS controller is not in the order.	704853-B21
HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	582765-B21
	HP Insight Control for Linux including 1yr 24x7 Support ML/DL Bundle 1 Server FIO License	TC203A

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below.

Core Options

NOTE: Some options may not be integrated at the factory. Contact your local sales representative for additional information.

HP Processors	**Eight-Core Processors**	
	NOTE: All support up to 1600MHz memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2470 (2.3GHz/8-core/20MB/95W) Processor Kit	678905-B21
	HP ML350e Gen8 Intel® Xeon® E5-2450 (2.1GHz/8-core/20MB/95W) Processor Kit	678903-B21
	HP ML350e Gen8 Intel® Xeon® E5-2450L (1.8GHz/8-core/20MB/70W) Processor Kit	678901-B21
	Six-Core Processors	
	NOTE: All support up to1333MHz DDR3 memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2440 (2.4GHz/6-core/15MB/95W) Processor Kit	665879-B21
	HP ML350e Gen8 Intel® Xeon® E5-2430 (2.2GHz/6-core/15MB/95W) Processor Kit	665870-B21
	HP ML350e Gen8 Intel® Xeon® E5-2430L (2.0GHz/6-core/15MB/60W) Processor Kit	665862-B21
	HP ML350e Gen8 Intel® Xeon® E5-2420 (1.9GHz/6-core/15MB/95W) Processor Kit	665868-B21
	Quad-Core Processors	
	NOTE: All support up to 1066MHz DDR3 memory speeds.	
	HP ML350e Gen8 Intel® Xeon® E5-2407 (2.2GHz/4-core/10MB/80W) Processor Kit	665866-B21
	HP ML350e Gen8 Intel® Xeon® E5-2403 (1.8GHz/4-core/10MB/80W) Processor Kit	665864-B21
HP Memory	**NOTE:** To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html	
	Registered DIMMs (RDIMMs)	
	NOTE: Redundant Enablement Kit (part # 664046-B21) is required whenever Registered DIMM is purchased.	
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
	HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	690802-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672631-B21
	Unbuffered with ECC DIMMs (UDIMMs)	
	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21

Core Options

	HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669322-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669324-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21
	NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator. **NOTE:** Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: http://h18004.www1.hp.com/products/servers/platforms/energyefficient/	
HP Drive Cage Options	HP 2nd Media Bay Cage Kit	661618-B21
	HP 5U 6 Large Form Factor (LFF) Hot Plug Drive Cage Kit	659485-B21
	HP 5U 8 Small Form Factor (SFF) Hot Plug Drive Cage Kit	659484-B21
	NOTE: Only 4 SATA drives are supported with the embedded controller. Additional controller is required to support more than 4 SATA drives.	
HP Optical Drives	HP Half-Height SATA DVD ROM JackBlack Optical Drive	624189-B21
	HP Half-Height SATA DVD RW JackBlack Optical Drive	624192-B21
HP Hard Drives	**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components. **NOTE:** Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.	
	SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives	
	HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652589-B21
	HP 600GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652583-B21
	HP 450GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652572-B21
	HP 300GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652564-B21
	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652611-B21
	HP 146GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652605-B21
	SAS Hot Plug SmartDrive SFF (2.5-inch) Midline Drives	
	HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652749-B21
	HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652745-B21
	SAS Hot Plug SmartDrive LFF (3.5-inch) Enterprise Drives	
	HP 600GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652620-B21

HP 450GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652615-B21
SAS Hot Plug SmartDrive LFF (3.5-inch) Midline Drives	
HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652766-B21
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652757-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652753-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
6G SATA Hot Plug with SmartDrive SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655710-B21
HP 500GB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655708-B21
6G SATA Hot Plug with SmartDrive LFF (3.5-inch) Midline (MDL) Drives	
HP 3TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	628061-B21
HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658079-B21
HP 1TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	657750-B21
HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658071-B21
6G SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 3TB 6G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive	628065-B21
HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive	659339-B21
HP 1TB 6G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive	659337-B21
HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive	659341-B21
NOTE: SATA hard drives have a 1-year warranty. Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html	
3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	
HP 100GB 3G SATA MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653112-B21
3G SATA MLC Hot Plug LFF (3.5-inch) Enterprise Mainstream Solid State Drives	
HP 100GB 3G SATA MLC LFF (3.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653122-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html	
Hard Drive Kits	
NOTE: All Factory Integrated Models will be populated with sufficient hard drive blanks based on the number of initial hard drives ordered with the server.	
HP 2nd Media Bay Cage Kit	661618-B21
HP 5U 6 Large Form Factor (LFF) Hot Plug Drive Cage Kit	659485-B21
HP 5U 8 Small Form Factor (SFF) Hot Plug Drive Cage Kit	659484-B21
HP ML350e Gen8 Large Form Factor (LFF) 5/6 Hard Drive Cable Kit	684527-B21
NOTE: This cable is required for upgrade from 4 LFF hot plug models to 6 LFF hot plug models. A SAS controller needs to be purchased as well.	

Core Options

	HP LFF Gen8 Hard Drive Blank Kit	666986-B21
	HP SFF Gen8 Hard Drive Blank Kit	666987-B21
HP Networking	**Gigabit Ethernet adapters**	
	HP NC112T PCI Express Gigabit Server Adapter	503746-B21
	HP NC365T 4-port Ethernet Server Adapter	593722-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	HP Ethernet 1Gb 2-port 332T Adapter	615732-B21
	HP Ethernet 1Gb 2-port 361T Adapter	652497-B21
	10 Gigabit Ethernet adapters	
	HP NC523SFP 10Gb 2-port Server Adapter	593717-B21
	HP NC552SFP 10Gb 2-port Ethernet Server Adapter	614203-B21
	HP Ethernet 10Gb 2-port 530SFP Adapter	652503-B21
	HP Ethernet 10Gb 2-port 560SFP+ Adapter	665249-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs	
HP Power Supplies	**NOTE:** Mixing of power supplies in the same server is not supported. All power supplies inside a server must be exactly the same model. Mixing Gold, Platinum, and Platinum Plus certified power supplies is not supported.	
	NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor.	
	HP Common Slot Platinum Plus Power Supply Kits	
	NOTE: The following Power Supplies offer 94% Efficiency with support for Intelligent Power Discovery.	
	HP 460W Common Slot Platinum Plus Hot Plug Power Supply Kit	656362-B21
	HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit	656363-B21
	HP Common Slot Gold Power Supplies	
	NOTE: The following Power Supplies offer up to 92% efficiency.	
	HP 460W Common Slot Gold Hot Plug Power Supply Kit	503296-B21
	HP 750W Common Slot Gold Hot Plug Power Supply Kit	512327-B21
	Enablement Kit	
	HP Redundant Enablement Kit	664046-B21
	NOTE: Redundant Enablement Kit (part # 664046-B21) is required for any common slot power supply.	
	NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html	

Core Options

HP Cooling Options	HP Redundant Enablement Kit **NOTE:** Redundant Enablement Kit (part # 664046-B21) is required for any common slot power supply. **NOTE:** Redundant Enablement Kit comes with RPS cage/power backplane, PCIe fan baffle, and two (2) redundant fans.	664046-B21

Additional Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Insight Software	**HP Insight Control**	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	T9074BAE
	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Electronic License	TC278AAE
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	452148-B22
	HP Insight Management Media Kit **NOTE:** HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.	436222-B21
	HP Insight Control Server Deployment	
	HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License	T9082AAE
	HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License **NOTE:** Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key. **NOTE:** Customer will receive a license entitlement certificate. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service. **NOTE:** Licenses ship without media. The HP Insight Management Media Kit can be ordered separately, or can be downloaded at: http://www.hp.com/go/insightupdates. **NOTE:** For additional license options please see the Insight Control QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_na/12631_na.html	452151-B21
	HP Insight Control for Linux	
	HP Insight Control for Linux w/1yr 24x7 Supp ML/DL/SL Bundle Electronic 1 Svr LTU	TC203AAE
	HP Insight Control for Linux including 1yr 24x7 Support Electronic License	TC213AAE
	HP Insight Control for Linux including 1yr 24x7 Support Single Server License	TC209A
	HP Insight Control for Linux Media Kit **NOTE:** Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately. **NOTE:** Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: http://www.hp.com/go/ic-linux (click on Download button). **NOTE:** Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single set of activation keys. **NOTE:** For additional License Kits, including electronic licensing options, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html	TC208A

Additional Options

HP iLO Advanced License	**HP Integrated Lights-Out (iLO) Advanced for ProLiant Remote Management**	
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License **NOTE:** For more information, visit: http://www.hp.com/go/ilo.	512485-B21
High Performance Clusters	**HP Insight Cluster Management Utility**	
	HP Insight Cluster Management Utility 1yr 24x7 Flexible License	QL803B
	HP Insight Cluster Management Utility 3yr 24x7 Flexible License	BD476A
	NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.	
	HP Insight Cluster Management Utility Media	BD477A
	NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_na/12612_na.html	
	HP HPC Linux Value Pack	
	HP High Performance Computing Linux Value Pack 1 Processor Flexible License for ProLiant Servers	TC293B
	NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one socket (a.k.a. processor). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	
	HP High Performance Computing Linux Value Pack Media Kit for ProLiant Servers	TC294A
	NOTE: This part number can be used to purchase media including software and documentation, which will be delivered to the customer. **NOTE:** For additional license kits please see the QuickSpecs at http://h18004.www1.hp.com/products/quickspecs/13485_na/13485_na.html.	

Additional Options

HP Security	HP Trusted Platform Module Option **NOTE:** The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM. **NOTE:** ProLiant OS pre-installed units will come with the partition required for TPM deployment. **NOTE:** The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	488069-B21
	HP Security Bezel Kit **NOTE:** For restricting access to rack models only. Tower to Rack Conversion Tray kit (part # 665939-B21 needs to be purchased.	660584-B21

HP Storage Controllers	**SAS Controllers**	
	HP Smart Array P222 Controller	
	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller	631667-B21
	HP Smart Array P420 Controller	
	HP Smart Array P420/2GB FBWC 6Gb 2-ports Int SAS Controller	631671-B21
	HP Smart Array P420/1GB FBWC 6Gb 2-ports Int SAS Controller	631670-B21
	HP Smart Array P421 Controller	
	HP Smart Array P421/2GB FBWC 6Gb 2-ports Ext SAS Controller	631674-B21
	HP Smart Array P421/1GB FBWC 6Gb 2-ports Ext SAS Controller	631673-B21
	HP Smart Array P822 Controller	
	HP Smart Array P822/2GB FBWC 2-ports Int/4-ports Ext SAS Controller **NOTE:** Please note that this platform can support only one (1) P822 controller. This controller can only be installed in expansion slot#2.	615418-B21
	Optional Upgrades	
	HP 2GB P-series Smart Array Flash Backed Write Cache	631681-B21
	HP 512MB B-series 36 inch Dynamic Smart Array Flash Backed Write Cache for ML/DL	631922-B21
	HP Smart Array Advanced Pack 2.0 No Media 1 Server 1yr 24x7 Support Software	BC377A
	HP Smart Array Advanced Pack 2.0 No Media Electronic Lic 1yr 24x7 Support Software	BC390AAE
	HP Smart Array Advanced Pack 2.0 No Media Flexible Qty 1yr 24x7 Support Software	BC390A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14227_na/14227_na.html (Smart Array P222 Controller) http://h18000.www1.hp.com/products/quickspecs/14228_na/14228_na.html (Smart Array P420 Controller) http://h18000.www1.hp.com/products/quickspecs/14229_na/14229_na.html (Smart Array P421 Controller)	

Additional Options

	http://h18000.www1.hp.com/products/quickspecs/14341_na/14341_na.html (Smart Array P822 Controller) http://h18000.www1.hp.com/products/quickspecs/13200_na/13200_na.html (Smart Array Advanced Pack) http://h18000.www1.hp.com/products/quickspecs/14343_na/14343_na.html (Dynamic Smart Array Controllers)	
	HP Host Bus Adapters	
	HP H220 Host Bus Adapter	650933-B21
	HP H221 Host Bus Adapter	650931-B21
	HP H222 Host Bus Adapter	650926-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18004.www1.hp.com/products/quickspecs/14336_na/14336_na.html (HBA 220) http://h18004.www1.hp.com/products/quickspecs/14222_na/14222_na.html (HBA 221) http://h18004.www1.hp.com/products/quickspecs/14337_na/14337_na.html (HBA 222)	
	SCSI HBA	
	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter **NOTE:** Supports external drive attach.	412911-B21
	NOTE: Please see the following QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html	
HP Backup & Recovery Software	HP Basic Upgrade to Data Protector Express V6 for 1 Server E-LTU	TC333BAE
	HP Data Protector Express V6.0 for 1 Server E-LTU	TC330BAE
	HP Data Protector Express V6.0 for 10 Server E-LTU	TC332BAE
	HP Data Protector Express V6.0 for 3 Server E-LTU	TC331BAE
HP Tape Backup	**NOTE:** For the complete range of tape drives, autoloaders, libraries and media see: http://www.hp.com/go/tape. For hardware and software compatibility of HP tape backup products see: http://www.hp.com/storage/SPOCK. **NOTE:** Installation of tape drive requires ordering of 2nd Media Bay Cage, Part Number 661618-B21.	
	HP 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader **NOTE:** Requires HP 1U Tape Autoloader Rack Kit (AH166A) for rack installation. Connection using HP Smart Array P222Controller (631667-B21) recommended.	AK377A
	HP DAT160 SCSI Internal Tape Drive	Q1573B
	HP DAT160 USB Internal Tape Drive	Q1580B
	HP LTO-5 Ultrium 3000 SAS Internal Tape Drive **NOTE:** Connection using HP Smart Array P222Controller (631667-B21) recommended.	EH957B
	HP LTO-5 Ultrium 3000 SAS External Tape Drive	EH958B
	HP MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library **NOTE:** Connection using HP Smart Array P222Controller (631667-B21) recommended.	AK378A

Additional Options

	HP MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380A
	HP LTO-4 Ultrium 1760 SAS Internal WW Tape Drive **NOTE:** Connection using HP Smart Array P222Controller (631667-B21) recommended.	EH919B
	HP LTO-4 Ultrium 1840 SAS External Tape Drive	EH861B
	HP Ultrium 920 SAS Internal Tape Drive **NOTE:** Connection using HP Smart Array P222Controller (631667-B21) recommended.	EH847B
	HP Ultrium 448 SAS Internal Tape Drive	DW085B
HP Disk Backup	**NOTE:** For the complete range of RDX drives and media see: http://www.hp.com/go/rdx. For hardware and software compatibility of HP disk backup products see: http://www.hp.com/storage/SPOCK.	
	HP RDX Removable Disk Backup Systems USB	
	HP RDX160 Internal Removable Disk Backup System **NOTE:** 160GB of disk capacity per data cartridge.	AJ765A
	HP RDX1000 Internal Removable Disk Backup System **NOTE:** 1TB of disk capacity per data cartridge.	BV847A
	HP RDX320 Internal Removable Disk Backup System **NOTE:** 320GB of disk capacity per data cartridge.	AJ767A
	HP RDX500 Internal Removable Disk Backup System **NOTE:** 500GB of disk capacity per data cartridge.	AJ934A
HP Storage Options	**Converged Network Adapter**	
	HP CN1000Q Dual Port Converged Network Adapter	BS668A
	HP CN1100E Dual Port Converged Network Adapter	BK835A
HP Disk Storage Systems	**Disk Enclosures**	
	HP D2000 Disk Enclosures	
	HP D2600 Disk Enclosure	AJ940A
	HP D2700 Disk Enclosure	AJ941A
	NOTE: Please see the QuickSpecs for additional options and configuration information at: http://h18000.www1.hp.com/products/quickspecs/13404_na/13404_na.html	

Additional Options

HP Uninterruptible Power Systems

HP Tower UPS

HP T1500 G3 UPS Models

HP T1500 G3 1400VA NA Tower Uninterruptible Power System — AF450A

HP T1000 G3 UPS Models

HP T1000 G3 1000VA NA Tower Uninterruptible Power System — AF448A

NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/13160_na/13160_na.html

NOTE: For additional information on HP Uninterruptible Power Systems please go to: www.hp.com/servers/rackups.

NOTE: For additional information on sizing your server, please reference: http://www.upssizer.com.

NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.

HP Rack Options

HP USB Keyboard and Mouse

HP USB BFR with PVC Free US Keyboard/Mouse Kit — 631341-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13792_na/13792_na.html

HP Server Console Switches

HP Server Console 0x2x8 Port Analog Switch — AF616A

HP Server Console 0x2x16 Port Analog Switch — AF617A

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11834_na/11834_na.html

HP Server Console Switch G2 with Virtual Media & CAC

HP 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software — AF618A

HP 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software — AF619A

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13475_na/13475_na.html

HP IP Console Switch G2 with Virtual Media & CAC

HP 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software — AF620A

HP 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software — AF621A

HP 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software — AF622A

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13474_na/13474_na.html

Rack Kits

HP Tower to Rack Conversion Tray Kit — 665939-B21

Additional Options

HP USB and SD Options	HP 2GB USB Flash Media Drive Key Kit **NOTE:** HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Guide for installation instructions.	608447-B21
	HP 4GB Secure Digital High Capacity Flash Media Kit **NOTE:** Blank SD media device is supported for use with VMware and Citrix. SD media must be installed in the internal slot of the ProLiant server. Learn more at http://www.hp.com/go/proliantvirtualization.	580387-B21

HP Care Pack Services	HP Install ProLiant ML350e Service	U6D41E
	HP Installation non Standard Hours ProLiant ML350e Service	U6D42E
	HP Startup ProLiant ML350e Service	U6D43E
	HP Startup non Standard Hours Proliant ML350e Service	U6D44E
	HP 3 year 24 hour Call to Repair 24x7 ProLiant ML350e Hardware Support	U6D45E
	HP 3 year 24 hour Call to Repair 24x7 withDefective Media Retention ProLiant ML350e Hardware Support	U6D46E
	HP 3 year 4 hour 13x5 ProLiant ML350e Hardware Support	U6C87E
	HP 3 year 4 hour 24x7 ProLiant ML350e Collaborative Support	U6C91E
	HP 3 year 4 hour 24x7 ProLiant ML350e Hardware Support	U6C89E
	HP 3 year 4 hour 24x7 ProLiant ML350e Proactive Care Service	U6C93E
	HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant ML350e Collaborative Support	U6C92E
	HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant ML350e Proactive Care Service	U6C94E
	HP 3 year 4 hour 13x5 with Defective Media Retention ProLiant ML350e Hardware Support	U6C88E
	HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant ML350e Hardware Support	U6C90E
	HP 3 year 6 hour Call to Repair 24x7 ProLiant ML350e Collaborative Support	U6C97E
	HP 3 year 6 hour Call to Repair 24x7 ProLiant ML350e Hardware Support	U6C95E
	HP 3 year 6 hour Call to Repair 24x7 ProLiant ML350e Proactive Care Service	U6C99E
	HP 3 year 6 hour Call to Repair 24x7 with Defective Media Retention ProLiant ML350e Hardware Support	U6C96E
	HP 3 year 6 hour CalltoRepair 24x7 w/Defective Media Retention ProLiant ML350e Collaborative Support	U6C98E
	HP 3 year Next business day ProLiant ML350e Collaborative Support	U6C83E
	HP 3 year Next business day ProLiant ML350e Hardware Support	U6C81E
	HP 3 year Next business day ProLiant ML350e Proactive Care Service	U6C85E
	HP 3 year Next business day with Defective Media Retention ProLiant ML350e Collaborative Support	U6C84E

Additional Options

HP 3 year Next business day with Defective Media Retention ProLiant ML350e Hardware Support	U6C82E
HP 3 year Next business day with Defective Media Retention ProLiant ML350e Proactive Care Service	U6C86E
HP 3 year 6 hour Call to Repair 24x7 w/Defective Media Retention ProLiant ML350e Proactive Care SVC	U6D00E

NOTE: For more information, customer/resellers can contact:
http://www.hp.com/services/carepack

Smart Buys

HP ProLiant ML350e Gen8 E5-2403 1P 8GB-U Hot Plug 4LFF 460W PS Svr/S-Buy 686770-S01	**Processor**	(1) Intel® Xeon® E5-2403 (1.8GHz/4-core/80W/10MB) Processor
	Cache Memory	10MB (1 x 10MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/Zero Memory SATA Controller (RAID 0,1,10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

HP ProLiant ML350e Gen8 E5-2420 1P 8GB-U Hot Plug 4LFF 460W PS Svr/S-Buy 686771-S01	**Processor**	(1) Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Smart Buys

HP ProLiant ML350e Gen8 E5-2420 1P 8GB-U Hot Plug 4LFF 460W PS SBS Svr/S-Buy 686772-S01	**Processor**	(1) Intel® Xeon® E5-2420 (1.9GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	8GB (2 x 4GB) Unbuffered DIMMs PC3L-10600E
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Dynamic Smart Array B120i/512MB FBWC SATA Controller (RAID 0,1, 5, 10)
	Hard Drive	None ship standard; includes 3 LFF hard drive blanks
	Internal Storage	4 LFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	(1) 460 Watt Power Supply (non-hot plug, non-redundant)
	Fans	2 Non-Hot Plug, Non Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Operating System	MS W2011 SBS Standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

HP ProLiant ML350e Gen8 E5-2440 2P 16GB-R Hot Plug 8SFF 750W PS Svr/S-Buy 686773-S01	**Processor**	(2) Intel® Xeon® E5-2440 (2.4GHz/6-core/95W/15MB) Processor
	Cache Memory	15MB (1 x 15MB) Level 3
	Memory	16GB (2 x 8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit
	Network Controller	HP Ethernet 1Gb 2-port 361i Adapter
	Storage Controller	HP Smart Array P420/1GB FBWC Controller (RAID 0/1/1+0/5/5+0)
	Hard Drive	None ship standard; includes 7 SFF hard drive blanks
	Internal Storage	8SFF Hot Plug HDD Bays
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive
	Power Supply	HP 750W Common Slot Gold Hot Plug Power Supply Kit
	Fans	4 Redundant Fans
	Accessories	USB Keyboard and Mouse ship standard
	Management	HP iLO Management Engine (standard)
	Form Factor	Tower (5U)
	Warranty	Server Warranty includes 3-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response

Memory

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

DDR3 memory population guidelines

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

General Guidelines:

- White DIMM slots denote the first slot of a channel. For 1 DPC (DIMM per channel) populate white slots only.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- To maximize performance, balance the total memory capacity between all installed processors
  - Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
  - Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- Do not mix UDIMMs, RDIMMs or LRDIMMs
- Quad rank LR DIMMs are supported at 3 DIMMs per channel.
- DIMMs of different voltages (1.35V & 1.5V) may be mixed in any order
  - The system will power them at the higher voltage
- DIMMs of different speed grades may be mixed in any order
  - The system will select a common optimal speed
- Memory speed is a function of the processor QPI bus speed.

Population Guidelines:

- There are three (3) channels per processor; six (6) channels per server
- There are two (2) DIMM slots for each memory channel; twelve (12) total slots
- Memory channel 1 consists of the two (2) DIMMs that are furthest from the processor
- Memory channel 3 consists of the two (2) DIMMs that are closest to the processor

DIMM slot/capacity/populated speed table													
DIMM Type ->	**Registered DIMMS (RDIMMs)**							**Unbuffered with ECC DIMMs (UDIMMs)**					
DIMM Rank ->	**Single Rank (1R)**			**Dual Rank (2R)**				**Single Rank (1R)**		**Dual Rank (2R)**			
DIMM Capacity ->	4GB	4GB	8GB	8GB	8GB	16GB	16GB	2GB	2GB	4GB	4GB	8GB	8GB
DIMM Native Speed (MHz) ->	1333	1600	1600	1333	1600	1333	1600	1333	1600	1333	1600	1333	1600
Voltage	LV	Std	Std	LV	Std	LV	Std	LV	Std	LV	Std	LV	Std
SLOTS THAT CAN BE POPULATED													
12 slot servers	12	12	12	12	12	12	12	12	12	12	12	12	12
MAXIMUM CAPACITY (GB)*													
12 slot servers	48	48	96	96	96	192	192	24	24	48	48	96	96
POPULATED DIMM SPEED (MHz)													
1 DIMM Per Channel	1333	1600	1600	1333	1600	1333	1600	1333	1600	1333	1600	1333	1600
2 DIMM Per Channel	1333	1600	1600	1333	1600	1333	1600	1333**	1600	1333**	1600	1333**	1600

Memory

Please note:
Memory speed is a function of the processor QPI bus speed.
* Maximum capacity will vary based on individual server platform qualification schedule
** For HP SmartMemory, UDIMM is supported at 2DPC@DDR3-1333. Third party memory may only support up to 2DPC@DDR3-1066.

DIMM slot and configuration diagrams

Basic memory slot & population diagram

- Population order; start with "A" first, "B" second, "C" third, etc.

12 DIMM SLOTS (6 per CPU node)					
	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A	1	A	Chnl 1
	5	D	2	D	
Chnl 2	4	B	3	B	Chnl 2
	3	E	4	E	
Chnl 3	2	C	5	C	Chnl 3
	1	F	6	F	

Standard memory configuration (1 CPU model) - Entry models

- 2GB, consisting of one (1) 2GB single-rank PC3L-10600E-9 UDIMM

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 2GB UDIMM	1	A; empty	Chnl 1
	5	D; empty	2	D; empty	
Chnl 2	4	B; empty	3	B; empty	Chnl 2
	3	E; empty	4	E; empty	
Chnl 3	2	C; empty	5	C; empty	Chnl 3
	1	F; empty	6	F; empty	

Standard memory configuration (1 CPU model) - Base models

- 4GB, consisting of one (1) 4GB dual-rank PC3L-10600E-9 UDIMM

Memory

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 4GB UDIMM	1	A; empty	Chnl 1
	5	D; empty	2	D; empty	
Chnl 2	4	B; empty	3	B; empty	Chnl 2
	3	E; empty	4	E; empty	
Chnl 3	2	C; empty	5	C; empty	Chnl 3
	1	F; empty	6	F; empty	

Standard memory configuration (1 CPU model) - Performance models

- 8GB, consisting of two (2) 4GB dual-rank PC3L-10600E-9 UDIMMs

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 4GB UDIMM	1	A; empty	Chnl 1
	5	D; empty	2	D; empty	
Chnl 2	4	B; 4GB UDIMM	3	B; empty	Chnl 2
	3	E; empty	4	E; empty	
Chnl 3	2	C; empty	5	C; empty	Chnl 3
	1	F; empty	6	F; empty	

RDIMM maximum configuration (1 CPU model)

- 96GB, consisting of six (6) 16GB dual-rank PC3L-10600R-9 RDIMMs

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 16GB RDIMM	1	A; empty	Chnl 1
	5	D; 16GB RDIMM	2	D; empty	
Chnl 2	4	B; 16GB RDIMM	3	B; empty	Chnl 2
	3	E; 16GB RDIMM	4	E; empty	
Chnl 3	2	C; 16GB RDIMM	5	C; empty	Chnl 3
	1	F; 16GB RDIMM	6	F; empty	

UDIMM maximum configuration (1 CPU model)

- 48GB, consisting of six (6) 8GB dual-rank PC3L-10600E-9 UDIMMs

Memory

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 8GB RDIMM	1	A; empty	Chnl 1
	5	D; 8GB RDIMM	2	D; empty	
Chnl 2	4	B;8GB RDIMM	3	B; empty	Chnl 2
	3	E; 8GB RDIMM	4	E; empty	
Chnl 3	2	C; 8GB RDIMM	5	C; empty	Chnl 3
	1	F; 8GB RDIMM	6	F; empty	

RDIMM maximum configuration (2 CPU model)

- " 192GB, consisting of twenty (12) 16GB dual-rank PC3L-10600R-9 RDIMMs

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 16GB RDIMM	1	A; 16GB RDIMM	Chnl 1
	5	D; 16GB RDIMM	2	D; 16GB RDIMM	
Chnl 2	4	B; 16GB RDIMM	3	B; 16GB RDIMM	Chnl 2
	3	E; 16GB RDIMM	4	E; 16GB RDIMM	
Chnl 3	2	C; 16GB RDIMM	5	C; 16GB RDIMM	Chnl 3
	1	F; 16GB RDIMM	6	F; 16GB RDIMM	

UDIMM maximum configuration (2 CPU model)

- 96GB, consisting of twelve (12) 8GB dual-rank PC3L-10600E-9 UDIMMs

	Processor 1		Processor 2		
	slot #	population order	slot #	population order	
Chnl 1	6	A; 8GB RDIMM	1	A; 8GB RDIMM	Chnl 1
	5	D; 8GB RDIMM	2	D; 8GB RDIMM	
Chnl 2	4	B;8GB RDIMM	3	B;8GB RDIMM	Chnl 2
	3	E; 8GB RDIMM	4	E; 8GB RDIMM	
Chnl 3	2	C; 8GB RDIMM	5	C; 8GB RDIMM	Chnl 3
	1	F; 8GB RDIMM	6	F; 8GB RDIMM	

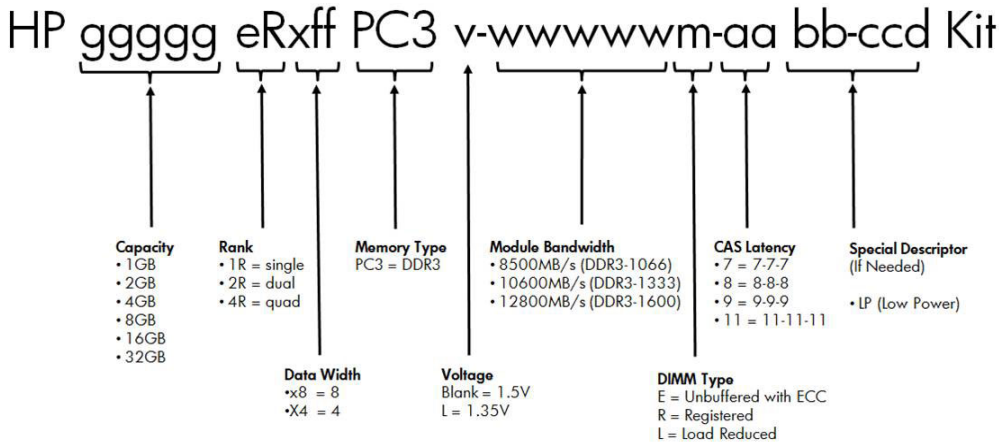
NOTE: Capacity references are rounded to the common Gigabyte values.

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB

Memory

- 8GB = 8192MB
- 16GB = 16384MB

DDR3 memory options part number decoder



Following are memory options available from HP:

HP Memory

NOTE: To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html

Registered DIMMs (RDIMMs)

NOTE: Redundant Enablement Kit (part # 664046-B21) is required whenever Registered DIMM is purchased.

HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	690802-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672631-B21

Unbuffered with ECC DIMMs (UDIMMs)

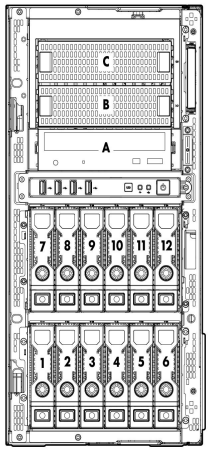
HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21

Memory

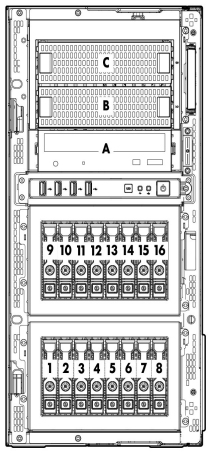
HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669322-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669324-B21
HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.
NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see:
http://h18004.www1.hp.com/products/servers/platforms/energyefficient/

Storage



1-12	12 x 3.5" (LFF) Hot-Plug SAS/SATA hard drive bays **NOTE:** Optional 2nd hard drive cage shown in configuration.
A	Optical Drive
B-C	Available half-height media bays, for up to two half-height optical/tape drives or a single, full-height tape drive.



1-16	16 x 2.5" (SFF) Hot-Plug SAS/SATA hard drive bays **NOTE:** Optional 2nd hard drive cage shown in configuration.
A	Optical Drive
B-C	Available half-height media bays, for up to two half-height optical/tape drives or a single, full height tape drive.

Drive Support

Storage

External Storage

	Quantity Supported	Position Supported	Controller
D2600 Disk Enclosure	Up to 4	External	HP Smart Array P222/512MB FBWC Controller
	Up to 8	External	HP Smart Array P421/1GB FBWC Controller
			HP Smart Array P421/2GB FBWC Controller
			HP Smart Array P822/2GB FBWC Controller
D2700 Disk Enclosure	Up to 4	External	HP Smart Array P222/512MB FBWC Controller
	Up to 8	External	HP Smart Array P421/1GB FBWC Controller
			HP Smart Array P421/2GB FBWC Controller
			HP Smart Array P822/2GB FBWC Controller

Tape and Disk-Based Backup

NOTE: For the complete range of tape drives, autoloaders, libraries and media, including the internal fitting models, see: http://www.hp.com/go/tape. For the complete range of D2D Backup Systems see: http://www.hp.com/go/d2d. For the complete range of RDX drives and media see: http://www.hp.com/go/rdx. For hardware and software compatibility of HP disk and tape backup products see: http://www.hp.com/storage/SPOCK.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP SCSI Tape Drives LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO4 Ultrium 1760 LTO-4 Ultrium 1840 DAT 72 DAT 160	Internal or External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter **NOTE:** Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	412911-B21
HP SCSI Rack Mount Kits 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP USB Tape Drives DAT 72 DAT 160	Internal or External	USB 2.0 Port	N/A
HP USB Rack Mount Kits 1U USB Rack-Mount Kit	External	USB 2.0 Port	
HP SAS Tape Drives DAT 160 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760	Internal or External	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller **NOTE:** Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	631667-B21

Storage

LTO-4 Ultrium 1840
LTO-5 Ultrium 3000
LTO-5 Ultrium 3280

HP SCSI Tape Autoloaders 1/8 G2 Autoloader	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP SCSI Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter **NOTE:** Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	412911-B21
HP SAS Tape Autoloaders and Libraries 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller **NOTE:** Please check the full compatibility information at: http://www.hp.com/storage/SPOCK	631667-B21
HP Fibre Channel Tape Libraries MSL2024 MSL4048 MSL8096	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpec.	
HP USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX1TB	Internal or External	USB 2.0 port	N/A
HP D2D Backup Systems, iSCSI D2D2500i D2D4000i	External	Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	
HP D2D Backup Systems, Fibre Channel D2D4000fc	External	Direct server attach is not supported, requires connection via SAN fabric. See: http://www.hp.com/storage/SPOCK	

Technical Specifications

System Unit	**Dimensions** (H x W x D) (with feet/bezel)	18.19 x 8.58 x 29.13 in (46.2 x 21.8 x 74.0 cm)	
	Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	96.67 lb (43.85 kg)
		Minimum (one hard drive, power supply, and processor installed)	57.21lb (25.95 kg)
	Input Requirements (per power supply)	Rated Line Voltage	100 to 240 VAC
		Rated Input Current	7.1 Amps (at 120VAC) to 3.5 Amps (at 240 VAC)
		Rated Input Frequency	50 to 60 Hz
		Rated Input Power	852 W
	BTU Rating	Maximum	460W - 1773 BTU / hr (at 120 VAC), 1715 (at 240 VAC) 750W - 2892 BTU / hr (at 120 VAC), 2797 (at 240 VAC) 1200W - 3530 BTU / hr (at 120 VAC), 4600 (at 240 VAC)
	Power Supply Output (per power supply)	Rated Steady-State Power	460(750) W (at 100 VAC) 460(750) W (at 200 VAC)
		Maximum Peak Power	460(750) W (at 100 VAC) 460(750) W (at 200 VAC)
	System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
		Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
	Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	3048 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	Idle	
	L WAd	4.2 B (Entry models) 4.2 B (Base models)
	L pAm	26 dB (Entry models) 25 dB (Base models)
	Operating	
	L WAd	4.2 B (Entry models) 4.3 B (Base models)
	L pAm	26 dB (Entry models) 26 dB (Base models)
	NOTE: Configurations tested for Entry models included Windows 2008 Enterprise 64-bit. **NOTE:** Configurations tested for Base models included one (1) 1TB non-hot plug LFF SATA HDD and Windows 2008 Enterprise 64-bit. **NOTE:** The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.	
Emissions Classification (EMC)	**FCC Rating**	Class B
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
	NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.	

Technical Specifications

HP Dynamic Smart Array B120i Controller	**Dimensions**	Embedded
	Disk Drive and Enclosure Interface - Transfer rate	Up to 6Gb/s SATA
	SATA Connectors	6 internal connectors with hot plug support
	Server Interface	PCIe 2.0
	SATA Speed	6Gb/s SATA links
	Cache Memory	optional 40-bit 512MB ECC protected Flash Backed Write Cache (FBWC)
	Logical Drives Supported	Zero Memory, Up to 2 logical volumes (6 physical drives)
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
	RAID Support	RAID 0 (Striping), RAID 1 (Mirroring) RAID 1+0 (Striping & Mirroring) RAID 5 with optional 512MB FBWC **NOTE:** 512 MB cache is required to enable RAID 5 support

HP Ethernet 1Gb 2-port 361i Adapter	**Network Interface**	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	IEEE 802.3 10Base-T	
		IEEE 802.3ab 1000Base-T	
		IEEE 802.3u 100Base-TX	
		IEEE 1588, IEEE 802.1AS	
		IEEE 802.3az - Energy Efficient Ethernet (EEE)	
	Data Transfer Method	PCI Express V2.0, 5.0 GT/s with x2 link (fixed)	
	Controller	Intel I350 Powerville	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s per port, 20 Mb/s Combined
		10Base-T (Full-Duplex)	20 Mb/s per port, 40 Mb/s Combined
		100Base-TX (Half-Duplex)	100 Mb/s per port, 200 Mb/s Combined
		100Base-TX (Full-Duplex)	200 Mb/s per port, 400 Mb/s Combined
		1000Base-TX (Half-Duplex)	1000Mb/s per port, 2000 Mb/s Combined
		1000 Base-TX (Full-Duplex)	2000Mb/s per port, 4000 Mb/s Combined
	Connector	RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX	Category 5E or better; up to 328 ft (100 m)

Technical Specifications

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.